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23 January 1974

MEMORANDUM: For The Record

SUBJECT: CASCON II Model Meeting with ACDA

1. A meeting was held this morning at ACDA with Ed Finegold and Jim Bodnar in room 5637, x 632-3247. Attending from the IC staff were [redacted] and myself. Also, [redacted] of CIA/OCI attended. STAT STAT STAT

2. Mr. Finegold briefly explained the CASCON model, pointing out that a local conflict could be broken down into five phases. A discussion was then held about the utility of the system and also the quality of the data. The system data file was created by using unclassified data for 52 conflicts and translating this data into generalized indicators and factors. Thus the system provides generalized indicators (factors) about conflicts by phase and allows a user to find out which conflicts have similiar factors. The user must go to a substantive data base outside the system for factual data.

3. Accordingly, one criticism of the system is that it is too general and does not provide substantive data. However, it was not designed to contain such data. Another criticism is that cultural differences make a factor important in one region and unimportant somewhere else. A possible solution to this problem would be to test regional data files. [redacted] suggested this as well as the possibility of the system being used as a training tool. It is also possible that the system factors could be used as a checklist perhaps in conjunction with a substantive data file. STAT

4. Only the first three phases of any conflict are coded at the current time. There are approximately 140 factors which can be applied against a particular phase. The system also defines the time frames of each phase.

5. [redacted] of OCI brought back substantive data on thirteen of the first twenty-six conflicts entered into the system. These were coded as factors by State Department analysts or academic specialists. The data on the remaining conflicts is not available in a consolidated form, if at all. STAT

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6. We were also given User Manuals that we will xerox and then return.

7. Mr. Finegold said SAGA of JCS (J-5) has also played with the model. We should contact them. David Moore of STATE has also tested the model, which we knew. It was also noted that Howard Weldeman of INR of State might have some knowledge of the system. No one has apparrently used it in an operational mode.

8. Attached is a summary report on the CASCON model that was given us by ACDA. All other documentation that we brought back from ACDA, including the CASCON II user manual, will be kept in IMC.

9. The meeting broke up at approximately 11:45 A.M. having lasted approximately 1 3/4 hours.

[redacted]n STAT

cc: NT Chrono

STAT [redacted]

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SUMMARY REPORT

INTRODUCTION

The work reported on here had its genesis in an earlier study under the sponsorship of the U.S. Arms Control and Disarmament Agency entitled Control of Local Conflict: A Design Study. That study sought to explore the general problem of conflict in the developing regions of the world. Through both theoretical analysis and the study of empirical historical evidence, the Design Study generated a dynamic model of conflict that formed a framework for the identification of conflict phases, factors militating toward and away from increased violence, and suggestive conflict control policy measures.* The goals of that study were to generate hypotheses about what we called "local conflicts," to test them to the extent possible, and to structure the problem in such a way that additional research and analytic tasks would emerge.

The analytic effort that is the subject of the present report stemmed from the desire to create some mechanism to make available to government or international organization officials the information, insights, and suggestions embodied in the Design Study and its

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*See Lincoln P. Bloomfield and Amelia C. Leiss (with others), Control of Local Conflict: A Design Study on Arms Control and Limited War in the Developing Areas, ACDA/WEC-98, Vol. II (Washington: GPO 1967), subsequently revised and published as Controlling Small Wars: A Strategy for the 1970's (New York: Alfred A. Knopf, 1969).

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accompanying historic case studies.* We accepted as part of our follow-on research the task of undertaking the experimental development of a computer-aided system to handle information on local conflict (which we christened CASCON). Our ultimate objective was to make believable and usable for the responsible official a variety of suggestive policy measures that might further the high goal of prevention, containment, or termination of a given local conflict, and thus the avoidance of possible escalation to nuclear war.

We would emphasize here, as we have sought to do at all stages of this research, in briefings, and in the experimental use of CASCON, that it is by no stretch of the imagination conceived or intended as a substitute for the indispensable human experience, judgment, and intuition that must inform national policy decisions. What we do assert is that, properly used, it can serve as an aid to the memory of the decision-maker by bringing before him in rapid and handy fashion pertinent experience of the past (while hopefully also encouraging him to consider the lessons of the past early rather than late in a crisis). And it can serve as an aid to his imagination by setting before him suggestive policy measures that might be relevant to his new problem, and thus might stimulate him to consider or recommend a wider and more comprehensive range of conflict-avoiding and peace-promoting options than he might otherwise think of.

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*Amelia C. Leiss and Lincoln P. Bloomfield (with others), Control of Local Conflict: A Design Study on Arms Control and Limited War in the Developing Areas, Studies of Conflict, ACDA/WEC-98, Volume III (Washington: GPO, 1967).

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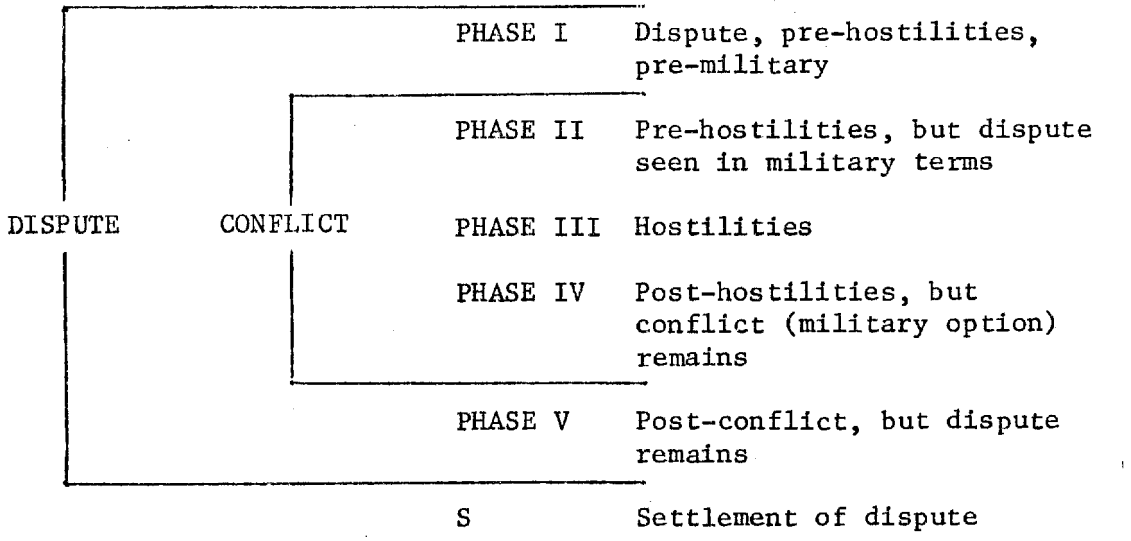
THE MODEL OF LOCAL CONFLICT

CASCON is a computerization of many of the features of the model of local conflict dynamics and control developed by Bloomfield and Leiss in the previous study.* It is that dynamic model of conflict which provides CASCON with a framework for the identification of phases of conflict; with specific factors tending toward and away from increased violence; and with suggestive policy measures aimed at preventing, minimizing, or terminating conflict. It is thus in order to present here a brief elaboration of the ACLIM model, to facilitate an understanding of CASCON. (ACLIM was an acronym for "arms control and limited war.")

Several hypotheses about the nature and course of local conflicts (and perhaps all political conflicts) are implicit in the dynamic model of conflict:

(1) Local conflicts have a general, common structure rather than being always unique and random processes.

(2) All conflicts go through a preliminary dispute phase (Phase I) and one or more of three basic conflict phases.



*Control of Local Conflict, op. cit.

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(3) In each phase factors can be identified that generate pressures tending to push the conflict across a threshold of transition into another phase; these factors may be countered by other factors that can be regarded as tending toward the prevention of that transition -- or generally toward Settlement.

These three hypotheses in turn enabled us to propose a fourth: (4) changes in the relationship among these specific factors will alter the likelihood of a conflict undergoing transition from one phase to another. This last hypothesis is at the very center of the quest for what the Design Study called a "Strategy of Conflict Control." It is embodied operationally in a fifth hypothesis: (5) the course of local conflicts can be significantly altered by policy measures aimed at reinforcing violence-minimizing factors and offsetting violence-generating factors, on the basis of "conflict-specific" factors identified for the phase in question.

In short, this analysis can suggest specific policy measures that may tend to "control" conflicts in the sense of averting their intensification, above all the possibility that they will expand to a nuclear war between the superpowers. Once said, this kind of analysis and logic may appear simple and thus obvious. But it has yet to be applied to a purposeful, integrated strategy in an age that increasingly appears to be the victim of ungovernable forces.

If this general line of reasoning is accepted, its essential simplicity then yields to far more complex and sophisticated ideas necessary for its implementation. Just as conflict is a dynamic process and not a single state of affairs, so also conflict control cannot be a single policy objective. Control is composed of several related but distinct objectives which differ from phase to phase.

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One control objective is common to every phase: to settle the underlying dispute. But, failing that, there are additional objectives to work toward. Initially, the objective is to keep a dispute (Phase I) nonmilitary. Once a military option has been introduced (Phase II), the objective is to prevent the outbreak of hostilities and to contain (i.e., restrict the scope/scale of) potential hostilities. If hostilities break out (Phase III), the objective is to contain (i.e., moderate) or terminate them. Once open hostilities are terminated (Phase IV), it is necessary to prevent their resumption and, once more, to restrict the scale of a potential resumption. If the disputants are pacified to a point where there is no longer any intention by either to seek a military solution (Phase V), the objective is to keep it that way.

Control is achieved through measures, i.e., policy actions that can be taken by governments, or international organizations, or perhaps even other groups, to offset factors that generate pressures toward violence and reinforce factors that tend away from violence. In Phase I, measures are directed at keeping the dispute non-military. In Phase II, measures are aimed at preventing (and containing potential) hostilities. In both phases, measures are designed to offset factors that tend toward crossing a threshold to the next phase, or to reinforce factors that tend toward settlement, or at least not to move the case into the next phase.

In Phase III, measures are either to offset factors that prolong or intensify hostilities, or to reinforce factors that tend to terminate or reduce fighting. Appropriate Phase IV measures would be those that offset factors tending back to hostilities, and those that reinforce factors influencing the case to move toward settlement.

Phases, factors, measures, and cases are the primary components of the ACLIM model. The ACLIM model just briefly discussed provides the conceptual framework on which CASCON is built.

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THE CASCON SYSTEM

CASCON was designed and implemented on a purely experimental basis, and is by no means a final or perfected system.

The working model of CASCON consists basically of a set of data and several computer programs in a high-speed electronic information-processing system. The CASCON experimental pilot system was designed to function in the first instance on M.I.T.'s Compatible Time Sharing System (CTSS), which utilizes an IBM 7094 computer. The programs are written primarily in MAD (Michigan Algorhythmic Decoder) and consist of about thirteen hundred statements. The utility of a time-sharing system is that any single user is given the impression that he has unhampered access to the computer while in reality up to thirty or so users can simultaneously make use of CTSS. Because computers can react faster than humans, during the moments a user is thinking and communicating to the computer, the computer is moving from one user to another, performing one task and then moving on to the next. Because of the extraordinary speed of operation the user has almost instantaneous feedback, and from his standpoint is interacting in what appears to be real time. It is the time-sharing capability of present-day high-speed computers that makes CASCON feasible.

As indicated, CASCON consists of two fundamental elements. The first element is the data base. The second is the set of computer programs that govern the operations performed on the data base and all the manipulation of data.

Cascon Data Base

The CASCON data base is itself made up of two components. The first is the textual material, consisting of factors, measures, and

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information about the local conflict cases from which the factors were originally derived.

In the Design Study and the fourteen original Historical-Analytical Case Studies, each factor (as well as each measure) was a specific product of the unique case situation, i.e., was "case-specific." Each factor applied in its entirety only to the case from which it was derived. An example of a case-specific factor is:

> Chinese advances in the Northeast Frontier Agency threatened the Assam oil fields and menaced Indian control of the narrow neck of land that connects Assam to the rest of India.

However, it early was clear that, given the purposes of CASCON, case-specific factors would not be appropriate, for it is obviously impossible that any new case of local conflict would ever have present a factor that was by definition specific to some past case. It was therefore necessary to generalize each factor. The generalized factor obtained from the above example is:

> Advances by one side threatened important economic resource area of other side.

Every factor in the Case Volume of the Design Study was generalized. Factors thus obtained were compared, and duplicates were combined into a single factor. The resulting general factors were then classed in terms of the categories into which they demonstrably fell.

After completing this process with the case-specific factors from the fourteen original ACLIM cases, we found we had generated 119 general factors for Phase I (Dispute, Pre-Conflict); 110 general factors in Phase II (Conflict, Pre-Hostilities); and 178 general factors in Phase III (Hostilities). For reasons of time and economy we decided not to concern ourselves with Phase IV in the experimental pilot model.

The same procedure was applied to measures. Each measure in

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the ACLIM Design Study had been derived as being appropriate for a single case-specific factor in the model. Thus the suggested measure for the case-specific factor given above was:

> Statements by India's supporters of intentions to intervene to protect vital economic, human resources.

As with factors, so each case-specific measure, to relate appropriately to a general factor, had to be restated in less specific terms. The general measure derived from the above specific measure is:

> Make clear other side's allies' intention to intervene to protect vital resources.

The result of the latter process was a list of 119 general measures in Phase I; 110 general measures in Phase II; and 178 general measures in Phase III. (Each general factor has at least one general measure.)

The third part of the textual data base is the case material. We believe it is unwise and even misleading to assume that any new case is just like any past case; in our view the relevant units of comparison should be groupings or clusters of factors. But in the pilot CASCON system, for convenience and simplicity, the units of analysis are cases. All information in the coded data base is stored by case, according to phase. The system currently contains data on 27 cases* of local conflict that have occurred since 1945. These cases are:

> The Algerian Civil War: 1954-1962
>
> The Algerian-Moroccan Conflict: 1962-1963
>
> The Angolan Conflict: 1950-1961

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*Fourteen of the cases were those examined in the original ACLIM project. Thirteen additional cases were researched by the Browne and Shaw International Studies Division of Bolt Beranek and Newman, Inc., under a separate ACDA contract, ACDA/IR-154.

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The Bay of Pigs: 1960-1961
The Bolivian Conflict: 1967
The Cuban Insurgency: 1952-1959
The Conflict on Cyprus (Enosis): 1954-1959
The Dominican Republic Conflict: 1963-1965
The Greek Insurgency: 1944-1949
The Guatemala Conflict: 1953-1954
The India-China Border Conflict: 1954-1962
The Indonesian-Malaysian Confrontation: 1963-1965
The Indonesian War of Independence: 1945-1949
The Iraq-Kurds Conflict: 1959-1963
The Kashmir Conflict: 1947-1949 (The Kashmir Conflict: 1949-1965, although part of the ACLIM studies, is not included in CASCON.)
The Kuwait-Iraq Conflict: 1961
The Lebanon Conflict: 1958
The Malayan Emergency: 1948-1960
The Philippines-Huk Conflict: 1946-1954
The Quemoy-Matsu Conflict: 1954-1958
The Sinai Conflict: 1956
The Somalian-Ethiopian-Kenyan Conflict: 1960-1964
The Suez Conflict: 1956
The Soviet-Iranian Conflict: 1941-1947
The Venezuela Conflict: 1960-1963
The West Irian Conflict: 1962-1963
The Yemeni Civil War: 1962-1969

Each general factor was coded for each of these past cases by experts who had been personally involved in the case in an official capacity. We also had some assistance from U.S. government officers. In addition, of course, we had the original case-researchers'

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judgments which we translated into our coding scheme.

The process of coding was roughly as follows: The coding expert checks off each general factor as being, in his recollection or knowledge, present or absent in the given phase. (If he does not recollect, or does not know, he checks "No Information.") If the factor was "not present or not true," he so marks his form and moves to the next factor.

If a factor is present, the expert must then decide if it had an effect on the course of the conflict. If it did not, it is coded as "present-no influence." But if he believes that a factor had such effect, the expert must decide if the effect is toward or away from violence, i.e., toward or away from the next phase. He must also judge whether the factor had "much," "some," or "little" influence toward or away from violence. Having made the last two decisions, the expert continues to the next factor and goes through the same procedure, eventually for all four hundred or so factors.

The Programs

The second major element of CASCON is the set of computer programs that permit operations to be performed on the information base. The programs are of two types. The first type of program provides for the organization of the textual material. The second group of programs is related to the on-line functioning of CASCON. The functions involved are: 1) to provide for the retrieval of information in directly usable form on an evolving local conflict, or on past conflicts with possibly presently relevant control measures; and 2) to retrieve the information on historical cases which embodied conflict patterns found to be similar to current cases of conflict.

1) The first major function calls for two activities--storing and retrieving data. CASCON provides a user with the facility to store

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information on a conflict with which he is currently concerned. The user does this by a process analogous to that done by the expert who coded the old cases. His basic task is to try to place a piece of information he may have into the context of the Factor Coding Form. If, for example, he knows that the military forces in the area of dispute are weak, he tries to find a general factor that covers that situation. He may either read through all of the factors in the Factor Coding Form to find the relevant one, or he may interact with the computer to narrow down the possible choices. Alternatively, the user may know much about his evolving case, and therefore just read through the Factor Coding Form, filling in the correct response in the same manner as did the expert for the 27 data-base cases. The user then goes to the computer and enters the information.

Data on new cases, as well as data on the past cases, can be retrieved. The user can find out which factors he (or a previous user) has already stored for a given case. This is important for review of a present case, as well as for determining what information is still lacking. Data on past cases might be retrieved either to find the presence of factors in past cases that are present in a new case, or to review past cases to get some insights into their evolution.

For example, a user might be interested in looking at the Algerian Civil War in Phase III, with special interest in factors in the military-strategic category. He might want to know which factors had much influence toward violence, or perhaps which had any influence ("much," "some," or "little") toward violence. CASCON would print out the factors that fulfilled the conditions set forth by the user.

Once a factor of interest is obtained, the user may wish to learn which other cases also had this factor. Thus, if factor 63 ("one side has resorted to guerrilla warfare") were the factor in question,

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the user could ask CASCON to "List Cases Having" factor 63 with "much influence toward." (He would find Malaya, Somalia, Cuba, Bolivia, Venezuela, and Algeria had this situation.)

An important aspect of the retrieval mechanisms of CASCON is the capability to retrieve measures. If a user had determined that a particular factor was present, he would then want to know the measure that the ACLIM analysis had suggested was logical and appropriate to reinforce the factor if it were violence-minimizing or to offset the factor if it were violence-promoting. The "List Measures" command permits such an operation to be performed. (It should be understood that of course a general measure might not always be appropriate to a specific new case; also violence-minimizing might not always be the paramount objective.)

Finally, the user might be interested in looking at a specific case in detail. This might be one of the past cases, or one of the current cases. CASCON facilitates this through the "Display" command. The user can look at the descriptive information of a case, or he can look at factors in a particular category, or even at all factors. CASCON prints out descriptive information, and it also can display each factor along with the coding of the factor for the particular case.

CASCON, then, allows a user to store information on an evolving or incipient local conflict in accordance with the phase structure and factor categories of the ACLIM Model, by use of the Factor Coding Form and the "Enter" command. CASCON also allows the retrieval of selected factor, case, or descriptive information for an evolving or incipient case, as well as past cases of local conflict, through the "List Cases Having," the "List Factors Having," the "List Measures," and the "Display" commands.

2) In addition to the retrieval of information on current or

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past local conflicts, CASCON allows the user to establish a pattern of past conflicts that are "similar" to a current case, for the purpose of providing the user with helpful insights in dealing with a new situation. The purpose behind giving the user "similar" case information is not to suggest that two situations are identical for, as we have warned, such an interpretation might prove dangerous if actions were taken in a new case based solely on some statistical relationship with a past case.

We rather envisage the "Compare" command as an intermediate step in the process we have described as an "Aid to the Imagination." Until the CASCON system can make statistical comparisons on the basis of factors alone, our working assumption is that a user of the pilot system may want to discover what past cases are "similar" to his current case so that he might himself examine in detail the factors in those cases. We reiterate that a "similar" case is a stepping stone to obtaining more information, not a goal in itself.

The present mechanism for obtaining "similar" cases is quite straightforward. We opted in the pilot model against employing very sophisticated techniques that would require considerable expertise in statistics in order to interpret quantitative results. The command in CASCON for finding "similar" cases is "Compare To Cases." The "Compare To Cases" command enables the user to determine which data in the database are most similar to the current case with regard to three measures: "comparability," "information," and "distance."

The question of what constitutes "similarity" between two cases is still under study. But provisionally, CASCON makes the following assumptions:

1) Two cases "seem similar" if they have present many of the same factors, and if these factors have the same effects (toward and away from violence).

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2) Two cases "seem similar" if in both instances the same effects are not present. The crucial similarity is of course in factors, not cases.

These two notions are incorporated in the "comparability" statistic. The "information" statistic is designed to measure simply the amount of mutual information two cases contain. The "distance" statistic allows various hypotheses to be examined concerning the relative importance (as regards the notion of "similarity") of factor values.

RECOMMENDATIONS FOR A FUTURE SYSTEM

CASCON as it is presently constructed is an experimental pilot working model. Within limits, even in its present form, it should be able to provide a policy official with some usable insights with regard to controlling local conflicts. It is, however, not a final system. Its principal accomplishment, in our view, is to supply provisional answers to two major questions, one conceptual, the other methodological. The conceptual question is whether information about historical situations can be organized, stored, and retrieved in a way that might be meaningful in dealing with a current problem. The methodological question is whether the capabilities of the high-speed computer can fruitfully be applied to solving the first question. We believe that the CASCON pilot model enables affirmative answers to be given for both questions.

There are doubtless other approaches that might have been taken than the one we chose. We used our ACLIM conflict and case model, and thus opted for a particular framework that is very policy-oriented and case-specific. What follows will assume that a final system would build on CASCON, rather than start afresh. As for the other question,

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CASCON itself is a demonstration that computers can be used to implement a theory of information-organization about local conflicts and policies pertaining thereto. What still remains is to suggest a number of avenues along which to proceed if a more perfected system is to be developed.

We therefore make the following recommendations:

1) All post-war cases of local conflict (according to our count, about 57) should be coded, plus at least some disputes that never became military.

2) At least three experts should be used to code each case.

3) Improved methods of reconciliation of coding differences should be examined, including measures of confidence in the values in the data base derived from coders' judgments.

4) Measures as well as factors should be coded as having been taken or not, along with some indication of outcome.

5) Provisions be made for coding cases that went to Phase IV, as well as those that went from Phase III to Phase IV and back to Phase III.

6) Factors should be re-examined to eliminate those that are ambiguous or repetitive, in addition to adding others that may be appropriate.

7) Provision should be made for coding factors that vary in effect during the course of a given phase.

8) A capability is needed to utilize data from sources other than the ACLIM model.

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9) The system should be made more flexible for the user.

10) A textual file of information about each case should be included.

11) A variety of statistical techniques that may be useful for CASCON should be investigated and provided for in an advanced system.

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STAT [redacted] — here is a memo for the record which I wrote on ACDA/CASCON mtg — STAT [redacted] has already added [redacted]'s comments to it — do you want to change or add anything? (this is only copy so far. treat it as a draft) — STAT [redacted]

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